A PECULIAR DEVONIAN DEPOSIT IN NORTHEASTERN ILLINOIS

THE village of Elmhurst is in the eastern edge of DuPage county, Illinois, on the Chicago and Northwestern Railway, fifteen miles west of the Wells Street Station in Chicago. On the north side of the railway track, about one mile west of the station, are the Elmhurst quarries. The rock quarried, which is the buff or bluish Niagara dolomite of northeastern Illinois and Wisconsin, has been excavated to a depth of about thirty feet.

At this locality the limestone is much fractured by two sets of gentle folds whose axes have a general north-west south-east and north-east south-west direction, joint cracks being well developed. Some of these cracks are several inches in width, and are in general filled with a black or blue clay. At one point, in the south-east face of the quarry, about eighteen feet below the glaciated surface of the rock, one of these joints is somewhat enlarged to form a narrow triangular opening about six inches in width at the base and about sixteen inches in height. This opening, instead of being filled with clay, as are all the other larger joints in the quarry, is filled with a breccia composed of angular fragments of the adjacent limestone, imbedded in a dark brown arenaceous matrix. This matrix is abundantly fossiliferous, containing immense numbers of fish teeth, and a smaller number of *Lingula* shells and other brachiopods, which indicate its Devonian age.

The situation of this most peculiar occurrence of Devonian fossils, deeply buried in the Niagara limestone, is shown in the accompanying illustrations. Figure 1 is a near view, showing the Devonian material filling the triangular opening to the left of the hammer. Figure 2 was taken from a greater distance, in order to show the position of the opening in the face of the

quarry about eighteen feet below the surface. The species of fossils recognized are as follows:

Fish teeth.
Ptyctodus calceolus N and W.
Diplodus priscus Eastman n. sp.
Diplodus striatus Eastman n. sp.

Brachiopods.
Lingula ligea H.?
Orbiculoidea newberryi H.?
Ambocoelia umbonata Con.

The most abundant species is *Ptyctodus calceolus*, whose tritors are present literally by the hundreds. This species is characteristic of the middle and upper Devonian faunas of the inte-

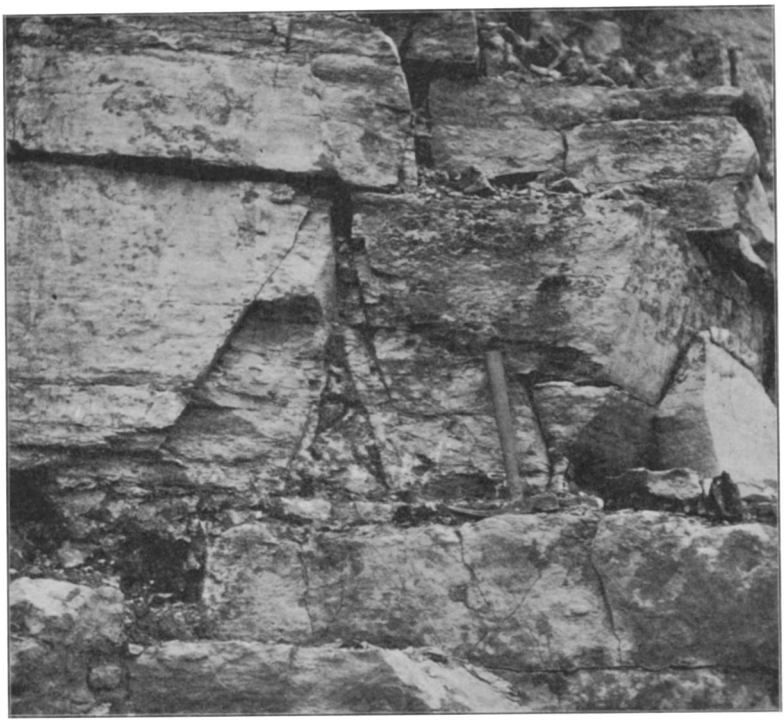

FIG. 1.

rior of North America. It has been recorded[1] from Canada, Milwaukee, Wis., western Illinois, Missouri, Iowa, and Manitoba. The Elmhurst specimens are generally smaller than those usually found in Iowa and other localities, but there seems to be no essential difference in form. The remaining fish teeth are two new

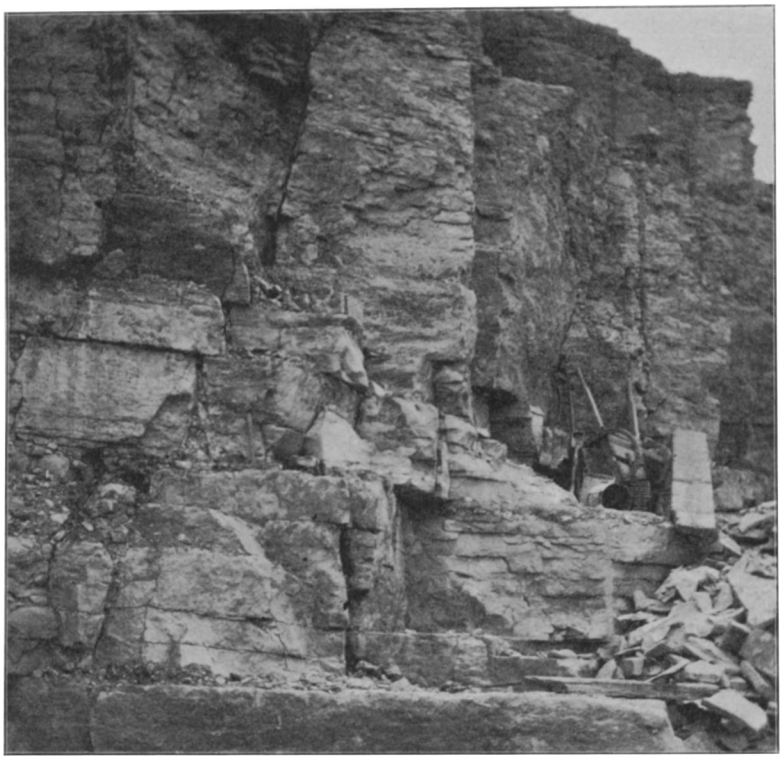

FIG. 2.

species of the genus *Diplodus* which have been described by Dr. C. R. Eastman.

Among the brachiopods, the one identified as *Lingula ligea* is the most abundant. It was originally described from the Hamilton in New York, but it also occurs in the Upper Devonian of the same state and has been recorded from the Devonian in

[1] Iowa Geol. Surv., 1898, Vol. VII, p. 114; Am. Nat., 1898, Vol. XXXII, p. 476.

Nevada. *Ambocoelia umbonata*, a single individual of which has been observed, is a common Hamilton species in New York, although a variety of the same species also occurs in the Upper Devonian. *Orbiculoidea newberryi*, also represented by a single observed specimen, has been recognized only in the Waverly series of Ohio, near the base of the Carboniferous.

The presence of *Ptyctodus* is certainly indicative of the Devonian age of the fauna, but *Diplodus* has previously been recognized only in Carboniferous strata, and the presence of two species of this genus with the Waverly species of *Orbiculoidea* would seem to indicate a very late Devonian age.

The presence of a fauna of this age in such a situation, is of extreme interest. The nearest point where Devonian strata form the surface rock is probably in northwestern Indiana, but that region is so heavily drift covered, and has been so little studied, that the exact distance from Elmhurst to the nearest Devonian strata in that direction cannot be determined with accuracy. Furthermore, the Devonian strata known in northern Indiana, are the black shales, and do not contain a fauna with *Ptyctodus*. The nearest actual outcrop of Devonian is at Milwaukee, Wis., eighty miles north of Elmhurst; and the nearest outcrop to the west is near Rock Island, Ill., one hundred and thirty miles away. At both of these localities *Ptyctodus calceolus* occurs, but the strata are believed to be somewhat older than the material from Elmhurst.

The presence of this Upper Devonian fauna at Elmhurst, buried as it is deep down in the Niagara limestone, indicates with certainty that during the greater part of Devonian time, the region now known as northern Illinois was above sea level. It was part of what was probably a large land surface, stretching from the Wisconsin land on the north to the Ozark land of Missouri on the south. The waters which collected upon this land surface in part percolated through the underlying rock strata and by solution increased the size of many joint cracks. At a later period, near the close of the Devonian, when the sea again occupied the region, sand was sifted down into these open joints, and with

it the teeth of fishes which inhabited the sea thereabout. It is perhaps possible that the opening which has in recent time been uncovered at Elmhurst, was during this late Devonian time large enough for the entrance of some of these fishes, and that they sought this opening for shelter, much as fishes at the present time enter similar openings.

The manner of communication between this opening and the surface is not clearly shown in the field, but arenaceous material

FIG. 3.

with fragments of fish teeth is seen clinging to the quarry face to the left of and above the opening. This material may be rather indistinctly seen in Fig. 1, being represented by the dark blotches upon the lighter colored rock in the position indicated. This rock face is one side of a joint whose opposite side has been removed, through which there may have been communication between the buried opening and the sea bottom above. The

Devonian material is not continuous for any great distance back from the quarry face, as will be seen in Fig. 3, this figure being a view taken nearly at right angles to that shown in Fig. 1, after the rock to the right of the opening against which the hammer leans in Fig. 1, has been removed. The Devonian material in the figure is the darker rock above and to the right of the hat, the line of demarcation between it and the limestone above being sharply defined; it is seen to thin out rapidly back from the quarry face.

At the base of the triangular opening, between the two beds of limestone that come in contact at that point, the Devonian material extends both to the right and to the left for several feet, forming a bed an inch or two in thickness between the two limestone beds. This bed has every appearance of having been deposited upon the lower limestone bed before the upper one was laid down, but in reality it was deposited at a much later date in a cavity which existed there near the close of Devonian time.

The sort of unconformity presented by this occurrence of Devonian sediments deeply buried in the Niagara limestone is peculiar. No description of any similar occurrence has been observed in the literature, and it may be designated by the name subterranean unconformity.

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